Chapter 11

Principles and Guidelines of optimized investment concept

Optimized Capital Expenditure Projects

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Means to minimize CAPEX

Principles and Guidelines of Optimized Investment Concept

Hansjörg Würmli
"Holderbank" Engineering Switzerland

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Means to minimize CAPEX

Content

- Introduction
- Design philosophy and guidelines
- Application in design and engineering
- Review meeting
- Conclusion

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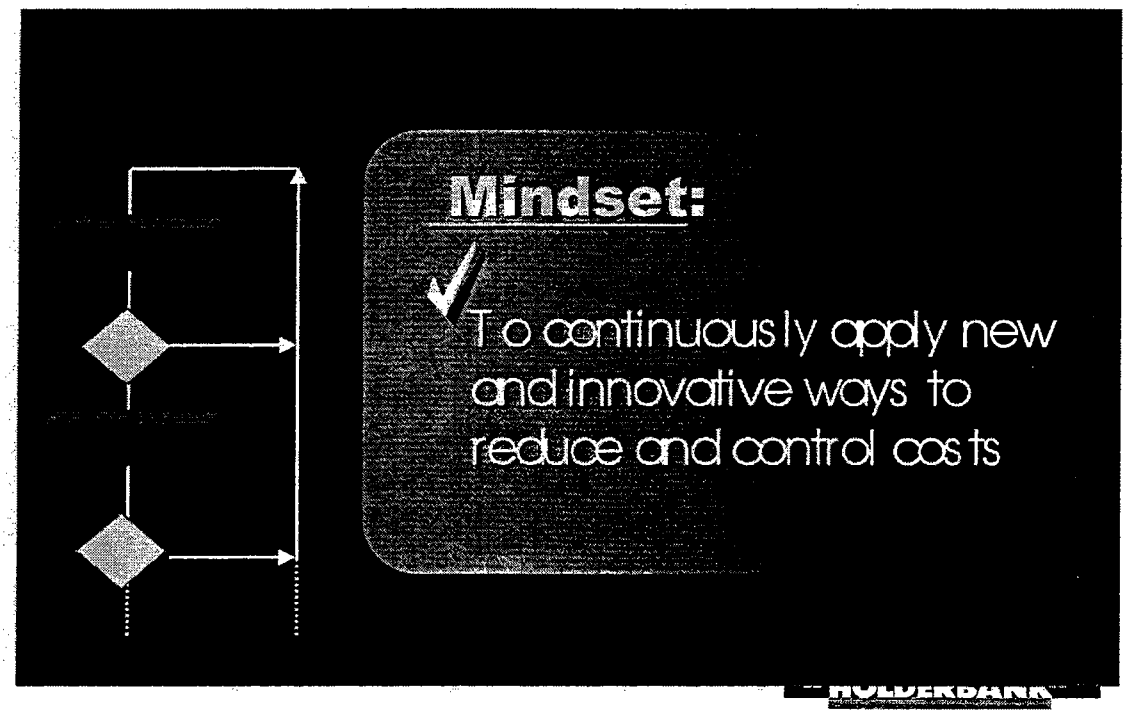
Means to minimize CAPEX



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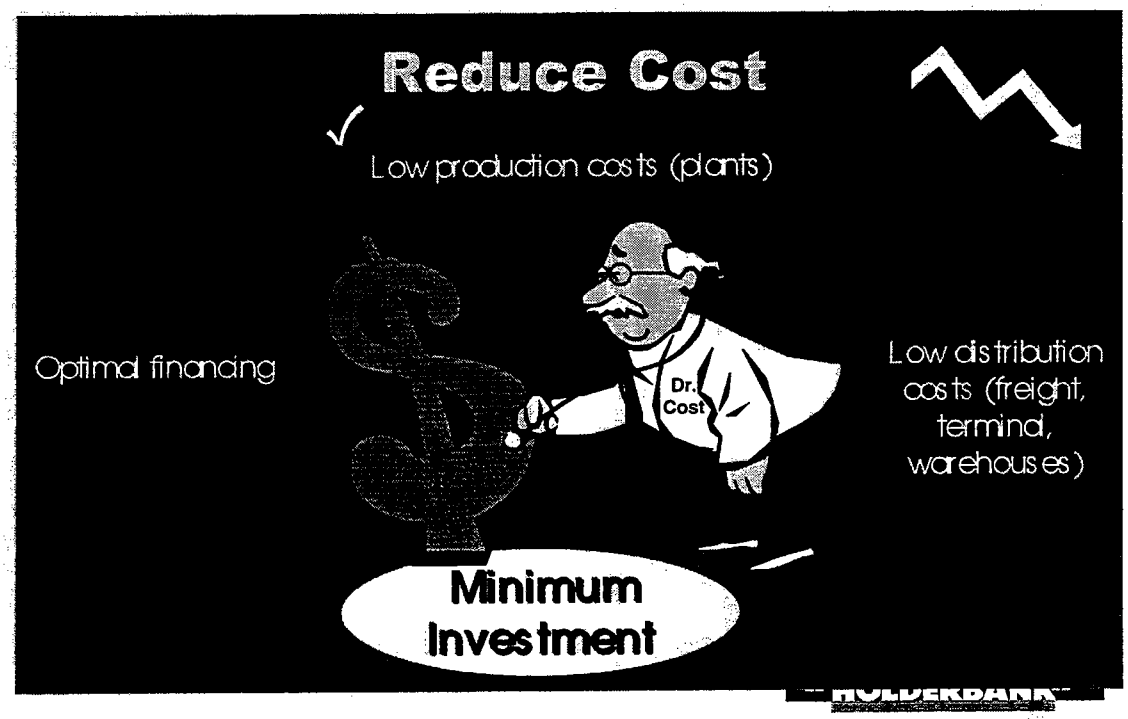
Means to minimize CAPEX



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Means to minimize CAPEX

ptimize nvestment :

- Is a design and engineering philosophy
- Is aiming at lowest initial investment at acceptable operating cost.

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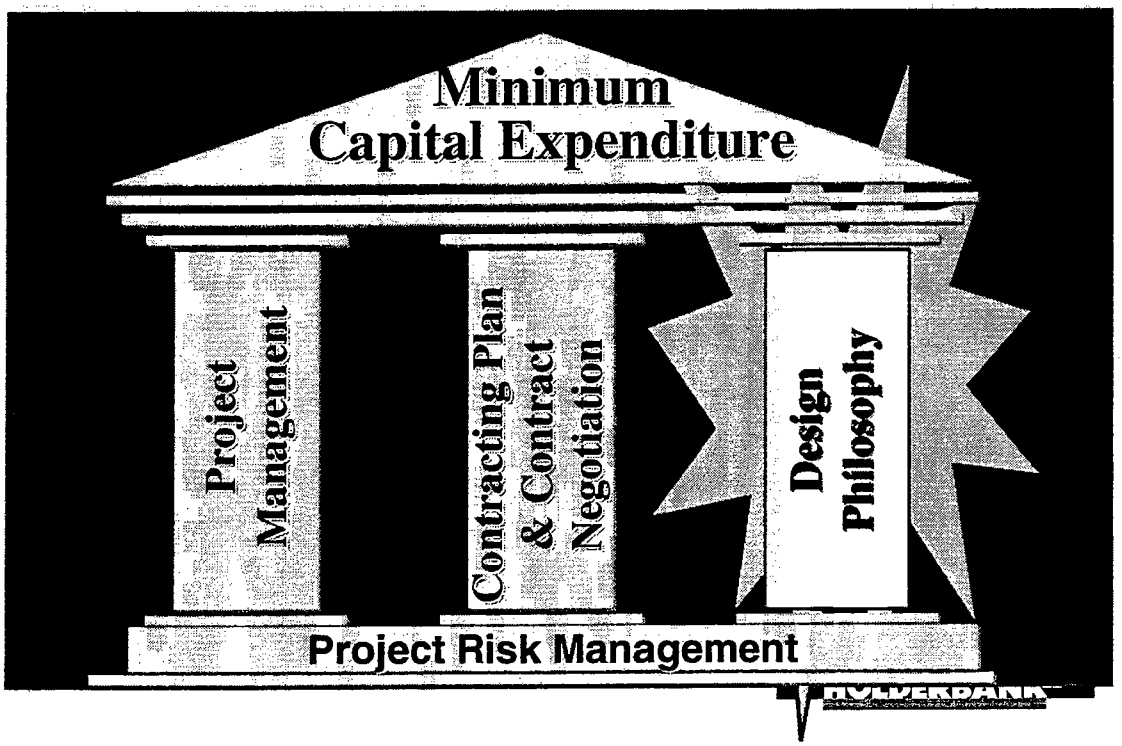
Means to Minimize CAPEX



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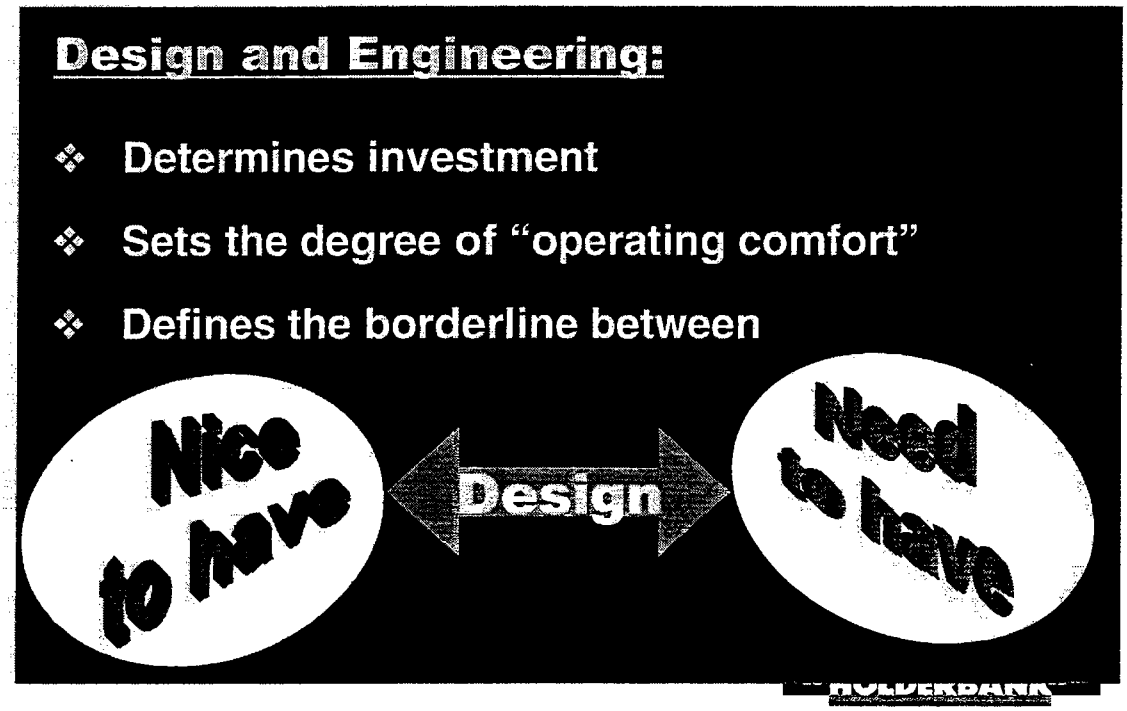
Design Philosophy



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Design Philosophy

Key Influencing Factors:

- Sizing and dimensioning of equipment, buildings and structures
- Arrangement of equipment
- Overall plant layout.

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Design Philosophy

Principles of Economic Design:

- Capacities of equipment within minimal practical limit
- Capacities of storages kept at minimum
- No standby equipment
- Step-wise project implementation
- No "nice to have", only "need to have"
- Buildings kept at minimum
- Value engineering
- Outsourcing
- Rent rather than buy
- (Use of second hand equipment)

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Design Philosophy

Plants built under the optimized Investment Concept are:

- Efficient
- Highly Reliable
- With State-of-the-Art Technology
- With Advanced Emission Control Systems
- AND PRODUCE HIGH QUALITY PRODUCTS.

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Design Philosophy

Economic Design means:

- Taking higher operational risks
- Accepting somewhat higher operating cost
- From "just in case" to "just in time"
  - Need for preventive maintenance
  - Need for better training of operating personnel
  - Need for contingency procedures
- Expect more difficulties during start-up of new installation.

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Design Philosophy

Economic Design does NOT mean:

- Taking uncalculated operational risks
- Cheap equipment
- Compromise on safety
- Compromise on product quality
- Compromise on environmental performance.

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Application of Economic Design

- Application in project concept and design from the beginning
- Design Reviews.

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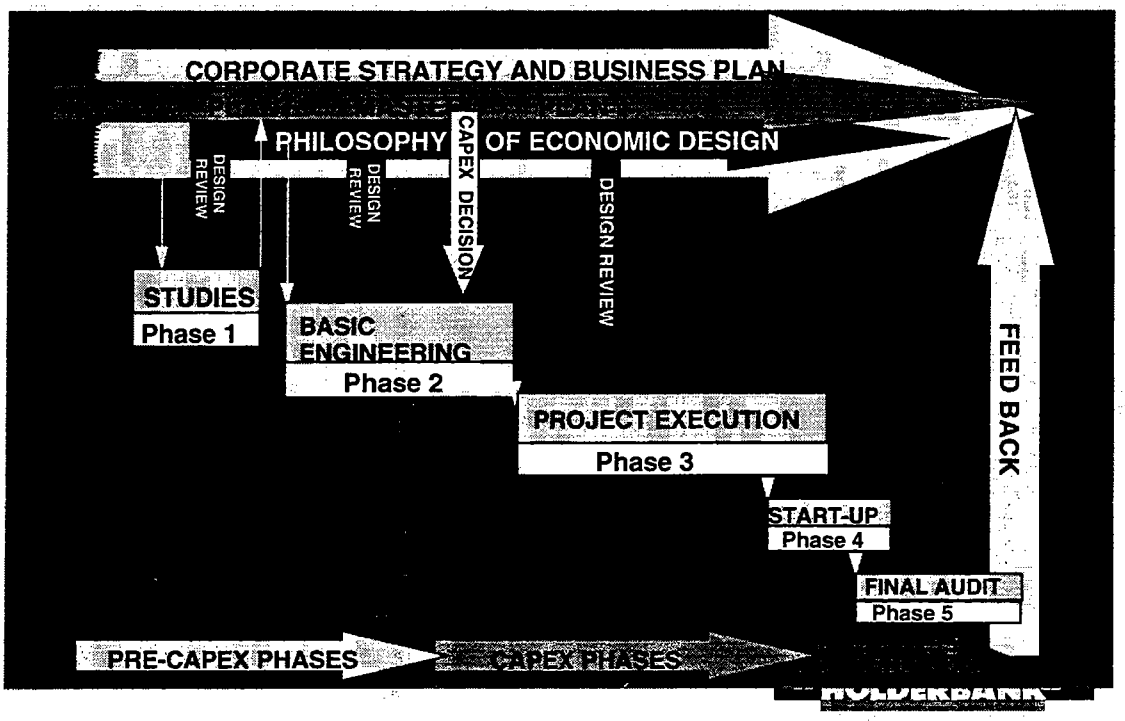

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Checkpoint
To ensure, that minimum investment requirements are followed in every major investment.
Plans and specifications need to be critically reviewed!
STOP
Project - Review Meeting

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- Critical assessment of proposed concept and technical solutions in consideration of minimal investment aspects.
- Consideration of alternatives resulting in reduced investment cost
- Assessment of consequences and risks
- List actions and proposal for further consideration by the project responsibles.

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Ideal composition of team:
"INSIDERS"
Client (responsible for investment and future operations)
Project team and specialists
"OUTSIDERS"
Experts with adequate knowledge of industry, but no knowledge about project.

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What:	Who:
❖ Presentation of project General, Target, Market, Environment	Client
❖ Detailed presentation of individual section	Project Manager
– Analyze for conformity with minimal investment targets	
– Questioning of proposed concept	Group
– Alternative proposals.	

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Action	Consequences	Risk
5) No auxiliary furnace for raw mill, as expected use is less than 10% of time.	At feed moisture >9% over extended period (>3 days), nominal kiln output my not be maintained. *Saving: USD 170 k*	Minimal loss of production; < 1%
6) Kiln feed bin: delete stand-by dosing device. Provide only outlet with blind flange.	Kiln must be stopped when dosing device fails. *Saving: USD 18 k*	Acceptable, second dosing system can be added later.
7) Delete roof and OHT crane over raw mill.	hire mobile crane for maintenance on SE/BE; provide sufficient hard standing area. *Savings: USD 425 k*	Non availability of mobile crane on short notice may lead to kiln stoppage.

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Success Factors:

- Structured approach to project engineering
- Commitment of all company levels, sharing of responsibility for decisions.
- Project Review with "outsiders"
- Inter-organizational learning
- Concept freeze after Project Review; discipline in project execution (danger of scope creep).

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Concept of Optimized Investment Cost has proven to be a powerful tool in reducing assets for new installations

- It can successfully be applied to every project, provided:
  - it is fully supported by management and all staff involved,
  - set targets are strictly adhered to during entire design and execution phase,
  - all personnel involved accepts strategy as a challenge which, when applied in an innovative, target oriented approach, will lead to cost effective solutions.

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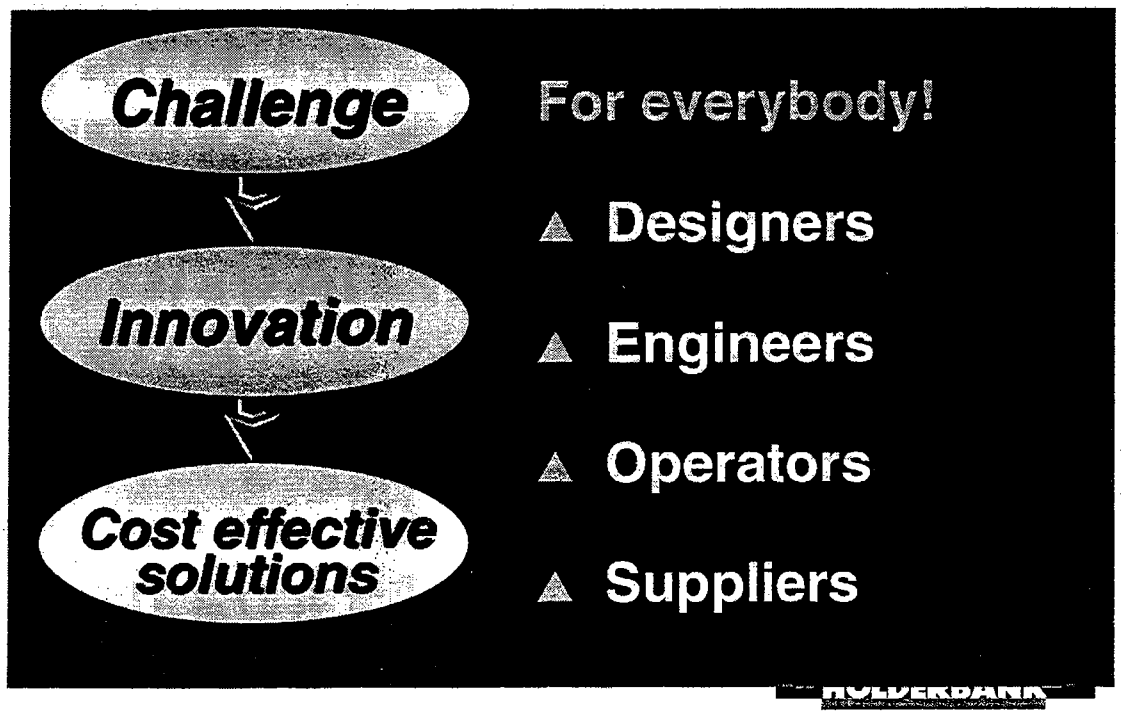

CAPEX Projects

General Project Procedures

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Procedures to Effective and Efficient Capital Expenditures

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Cement Seminar 2000

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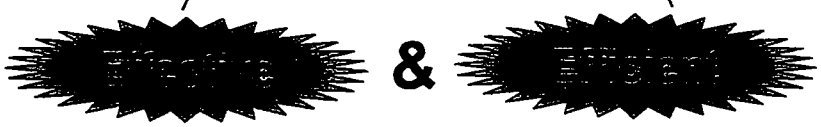
Procedures for Effective and Efficient Capital Expenditures

= Increase of fixed asset base
~ Investments in Property, Plant and Equipment

1. Replacement
2. Rationalization
3. Expansion, Diversification

4. Product Quality
5. Social & Safety
6. Environment



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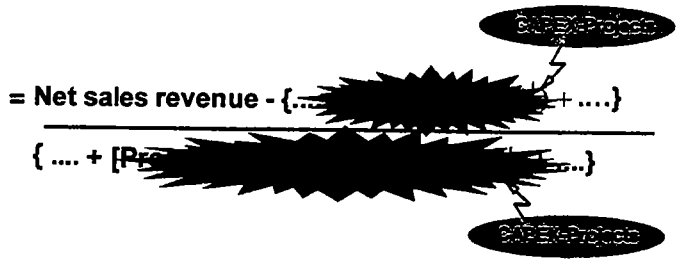
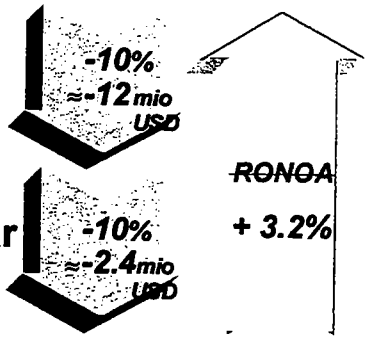
Impact of CAPEX on RONOA

Return On Net Operating Assets (↑) RONOA	Net sales revenue (↑) - Cost (↓) / Net Operating Assets (↓)	= EBIT / NOA



Impact of Asset Reduction on RONOA

- ❖Fixed assets value
- ❖Fixed operating cost per year
  - ⇨*interest (10%): 1.2 mio USD*
  - ⇨*depreciation (10 years): 1.2 mio USD*



Impact of Asset Reduction on RONOA

- ❖ **Substantial impact of investment cost on RONOA**
- ❖ **Investment cost are determined by ourselves**
- ❖ **Only <u>one</u> opportunity to influence investment cost**

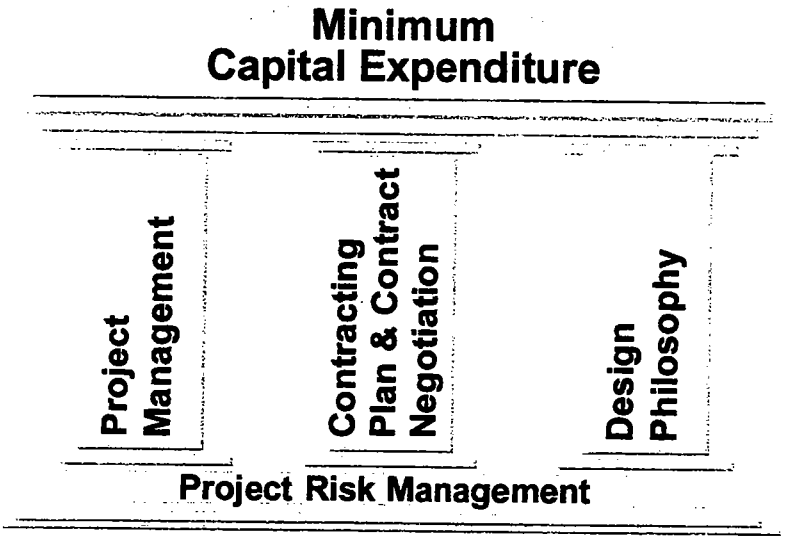
➡ ***Cost reduction is imperative for each investment in property, plant and equipment***

The "Holderbank" Group

Financial Key Figures

		1999	1998	1997
Net sales	*mio. CHF*	12194	11268	11265
Operating profit (EBIT)	*mio. CHF*	1706	1567	1435
Net Operating Assets (NOA)	*mio. CHF*	13648	12680	12173
Investments in Property, Plant and Equipment - Replacement - Expansion	*mio. CHF*	 480 631	 496 471	 577 823
Depreciation	*mio. CHF*	1151	1124	1143

Means to Minimize CAPEX



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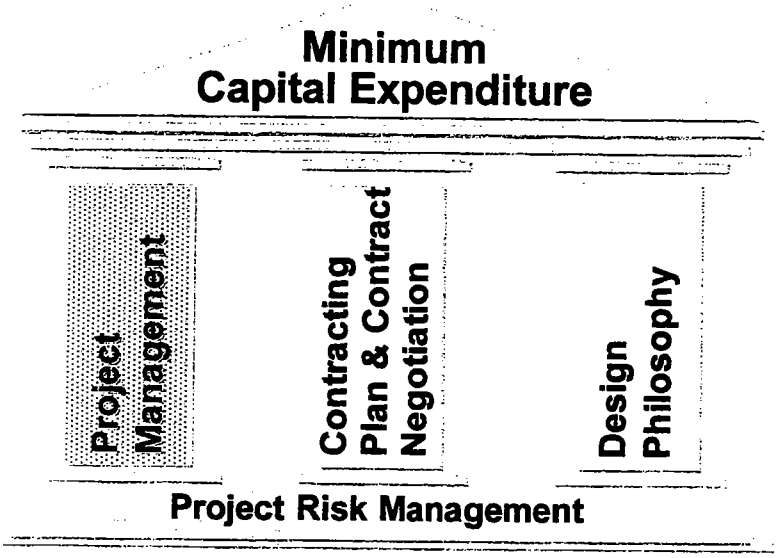
Means to Minimize CAPEX



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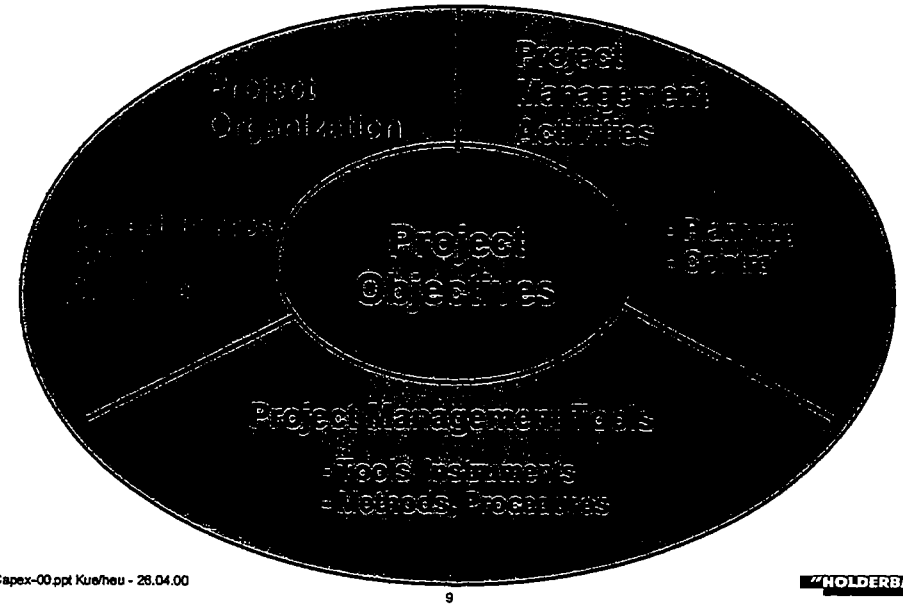
Elements of Project Management



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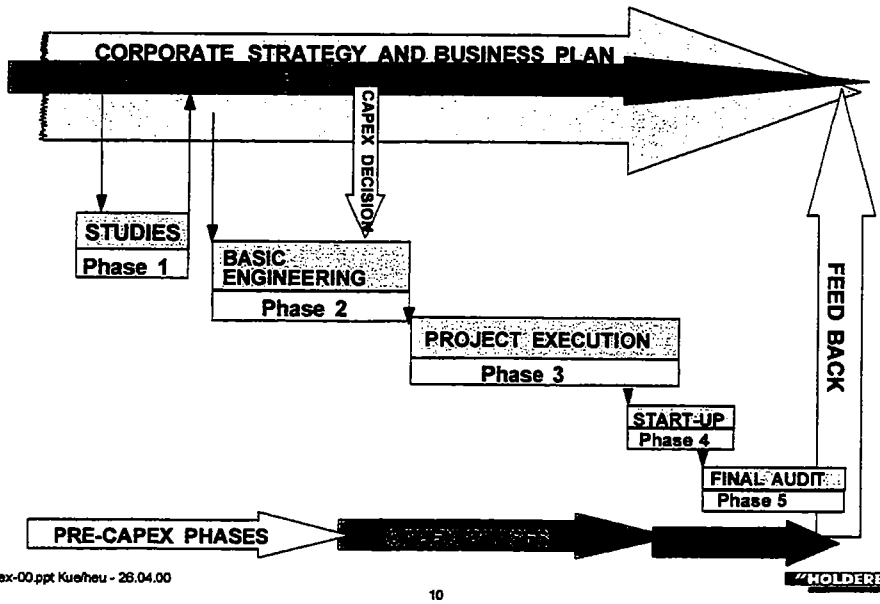
Project Organization : Project Phases



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Project Organization

Project Phases

Phase	Purpose
Study Phase	Establishing the technical, economic, legal environmental impact and often also the political base for an investment decision for a well defined project
Basic Engineering	Completion of engineering work up to the point of placing orders (letter of intent) with the main equipment supplier
Detailed Engineering/ Project Execution	Complete all detailed engineering, procurement and construction. Implement an overall project monitoring and control system for quick identification of problems and deviations from set targets and to enable fast and adequate corrective actions (schedule) (-> quality control).

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Project Organization

Project Phases

Phase	Purpose
cont.	Establish at an early date adequate organization and personnel structure to operate and maintain the plant/facilities. Assure raw materials supplies and utilities for start-up and normal operation.
Start-up/ Commissioning	Ensure that complete installations function properly and continuously under load. Ensure that contractual obligations by suppliers are met and full rated output is achieved on provisional taking-over of plant.
Final Audit	Evaluation of results achieved and recording the experience gained in the first year of operation.

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Project Organization

Set-up / Structure

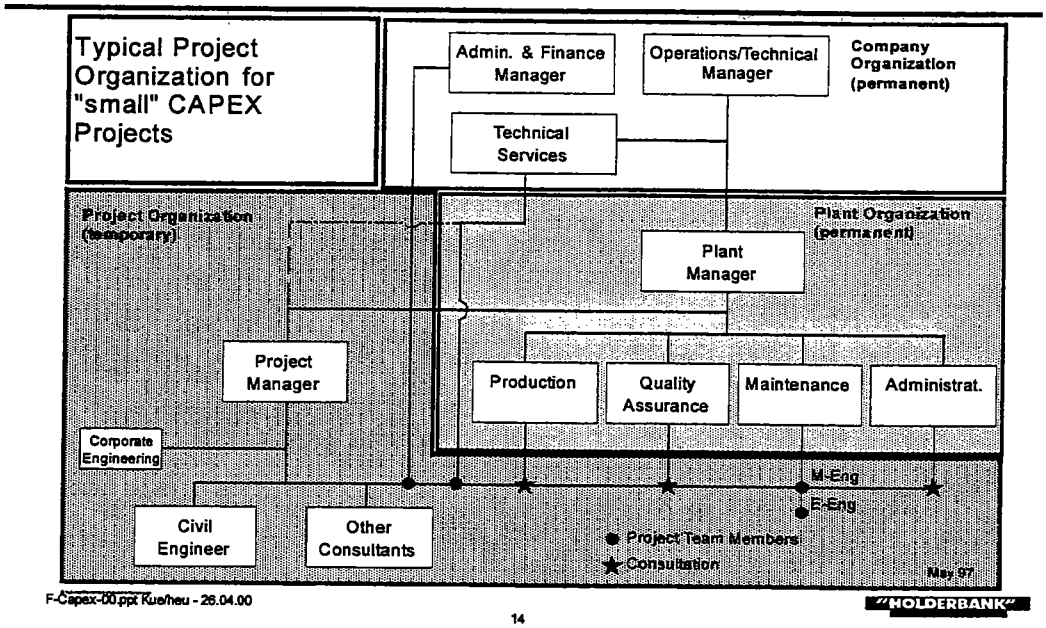
→ Internal organization of project team, assignment of tasks and responsibilities

→ Integration in plant / company / corporate organization

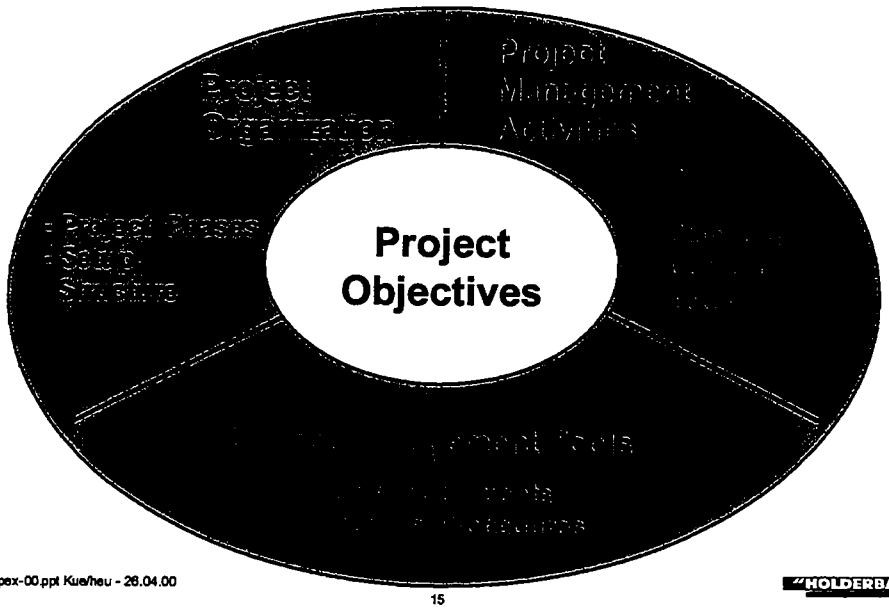
- **Organization Charts**
- **Job Descriptions**
- **Lines of Communications**,

...

Project Organization



Elements of Project Management



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Project Management Activities

Planning

→ **Establish Project Organization**

→ **Plan Project Activities**

- Sub-phases, intermediate objectives
- Individual tasks
- Coordination of individual tasks
- Requirements estimation: personnel, time
- Cost estimation
- Time schedule with milestones
- Project information system

→ **Define Project Management Tools**

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Project Management Activities

Control

→ Monitor time and cost

→ Monitor project progress, quality

→ Take measures where plan deviations occur

→ Coordinate & monitor various teams (Owner - Supplier(s) / Contractor(s))

Project Progress Report

Project Management Activities

Tools

Project Management Approach and Computer Tools
(Standardization, if possible)
- Text, Spreadsheets ...
- Computer Aided Design
- Electronic Mail
- Project Planning

→ Standard Reports

→ Standard Meetings

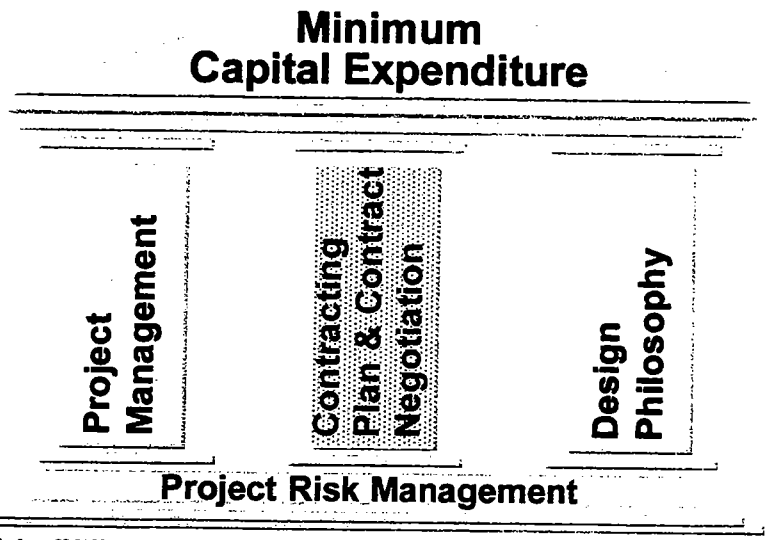
→ Lines of Communication

→ Agreements / Documents on Critical Issues

→ Project Procedure Manual

→ ...

Means to Minimize CAPEX



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Contracting Plan and Contract Negotiation

- **Detail - Package - Turnkey**
  - ⇨ *to suit best the project*
- **Contract negotiation**
  - ⇨ *effective negotiation techniques*
- **Tender documents and tender evaluation**
  - ⇨ *quality determines effectivity and efficiency of contract negotiations*

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Summary and Conclusion

Successful Project Implementation and Minimization of CAPEX:

→ Projects embedded in company strategy
(→ Plant Masterplan!)

→ Proper project organization : → Phases of CAPEX projects
→ Project team

→ Proper performance of standard project management activities and application of adequate project management tools

→ Appropriate contracting strategy and effective negotiation